

CASE REPORT

# Use of a natural tooth crown as a pontic following cervical root fracture: a case report

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**Abstract**

The loss of anterior teeth can be psychologically and socially damaging to the patient. Despite a wide range of treatment options available, traumatised teeth may be inevitably lost on certain occasions. This paper describes the immediate replacement of a right central incisor using a fibre-composite resin with the natural tooth crown as a pontic. The abutment teeth can be conserved with minimal or no preparation, thus keeping the technique reversible, and can be completed at chair side thereby avoiding laboratory costs. It can be used as an interim measure or a definitive prosthesis.

**Introduction**

Significant improvements in tooth coloured restorative materials and adhesive techniques have resulted in numerous conservative aesthetic treatment possibilities. As Goldstein said, aesthetic dentistry is the art of dentistry in its purest form. As with many forms of art, conservative aesthetic dentistry provides a means of artistic expression that feeds on creativity and imagination. Dentists find performing conservative aesthetic procedures enjoyable, and patients appreciate the immediate aesthetic improvements rendered.

Conservation, natural preservation, minimal invasion, aesthetics and cost are some of the important factors that are considered when replacing a missing tooth, as well as prosthesis biocompatibility and oral hygiene maintenance.

Dentists occasionally are faced with the difficult aesthetic situation of having to remove an anterior tooth because of trauma, advanced periodontal disease, root resorption or failed endodontic therapy. Following loss of the anterior tooth, it is important that an immediate replacement is provided in order to avoid aesthetic, masticatory and phonetic difficulties, and to maintain

the edentulous space. Conventionally, the solution to this clinical problem has been the provision of a single tooth, removable temporary acrylic prosthesis or resin-bonded bridges; each having their specific advantages and disadvantages in terms of usage, aesthetics and compatibility (1–3).

Using the natural tooth as a pontic offers the benefits of being the right size, shape and colour. Moreover, the positive psychological value to the patient in using his or her natural tooth is an added benefit. When the crown of the tooth is in good condition, it can be temporarily bonded easily to the adjacent teeth with light-cured restorative material.

The present paper reports utilisation of the clinical crown of a fractured right central incisor at cementoenamel junction as a natural pontic.

**Case report**

A 40-year-old healthy male patient reported to the Department of Conservative Dentistry and Endodontics, Manipal College of Dental Sciences, Mangalore, with a complaint of fracture maxillary right central incisor. The tooth had been traumatised by fall injury few days back.



**Figure 1** Preoperative, 11 crown root fracture at cervical level.

On clinical examination, there was an oblique crown root fracture extending to mid-root (Fig. 1). Fracture was reconfirmed by advising intra oral peri-apical (IOPA) radiograph. Adjacent teeth were checked for vitality and showed normal response. Both clinical and radiographic findings stipulated extraction of the traumatised incisor followed by fabrication of a temporary denture for the rehabilitation of function and aesthetics. Because the patient was highly concerned with aesthetics, the possibility of using the clinical crown as a natural pontic was proposed.

#### Case selection and general guidelines

Case selection criteria indicating usage of a natural tooth as a pontic bonded with fibre splint-composite resin are the following:

1. patients desiring to have natural tooth back in place when it is due for extraction;
2. patients wanting a minimally invasive procedure;
3. patients desiring fast and immediate fixation in an aesthetically important area;
4. the extracted tooth crown and abutments must be in reasonably good condition;
5. natural tooth pontic must not participate in heavy centric or functional occlusion;
6. cost-effective replacement;
7. periodontally involved teeth that warrant extraction;
8. teeth have fractured roots;
9. teeth are unsuccessfully reimplanted after avulsion; and
10. root canal treatment has been unsuccessful.

Contraindications for the procedure are the following:

1. interfering parafunctional habits;
2. short clinical crown for bond adhesion;
3. inadequate occlusal clearance space for reinforced fibre or orthodontic wire-composite resin bonding;



**Figure 2** Empty socket after extraction of 11.



**Figure 3** Natural tooth crown, after resected from root.

4. inability to maintain isolation of field during bonding procedures; and
5. primary dentition.

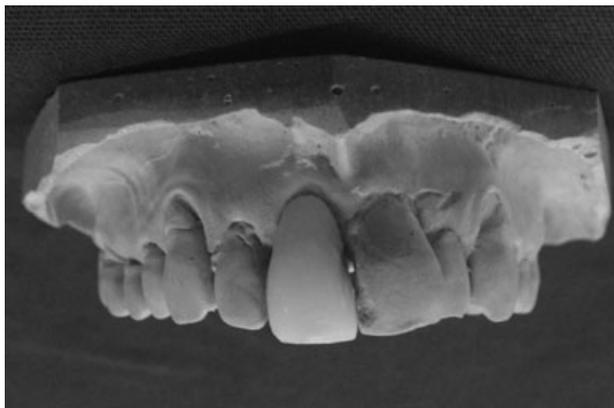
#### Technique

##### *Initial treatment*

After formulating treatment plan, firstly alginate impressions (Zelgan 2000 DENTSPLY India Pvt. Ltd.) of upper and lower arch were taken and casts using dental stone (Kelrock) were prepared. The tooth was atraumatically extracted under local anaesthesia and haemostasis achieved (Fig. 2). The extracted tooth crown was separated from fracture root using diamond disc and stored in saline until chair side procedure (Fig. 3).

##### *Customising the extracted natural tooth*

After sectioning the newly created apical opening of the pulp canal is cleaned, enlarged slightly and sealed with



**Figure 4** Natural tooth crown pontic placed on the cast.

resin composite. A modified ridge lap shape is given to cervical area to facilitate cleaning and appearance of emerging profile. Position of this natural tooth pontic was tried on the cast and an index of putty elastomeric impression (DENTSPLY caulk Dentsply International Inc, Milford, DE) material was made (Fig. 4).

#### *Fibre strip measurement*

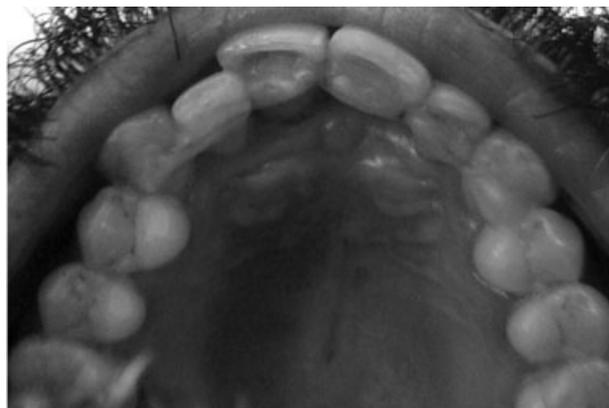
The required length of glass fibre strip (Polydentia SA CH-6805 Mezzovico, Switzerland) is measured from maxillary right canine to left canine on the cast and placed on a clean surface to prevent contamination.

#### *Teeth preparation for bonding*

Following satisfactory try-in and occlusal adjustments, the abutment teeth were roughened using coarse flame shaped diamond abrasive instrument then isolated, cleaned and dried. The pontic was also cleaned with pumice, washed and dried. The abutment teeth and pontic were then etched with 35% phosphoric acid (Mission Dental, Tinton Falls, NJ, USA) for 30 s, washed and dried. Unfilled bonding resin (Adper Single Bond 2, 3M ESPE, St. Paul, MN, USA) was applied to the etched enamel and cured. A thin layer of composite resin (flowable composite 3M ESPE, Filtek™Z350) was placed across the abutment teeth and pontic (Fig. 5). The pre-cut fibre was thoroughly wetted using the unfilled resin, placed over the composite and cured. A further layer of composite was placed over the tape, ensuring that all of it was covered by composite, and cured. Excess composite resin was removed and occlusal interferences were again checked in protrusion and lateral excursions (Fig. 6). Finishing and polishing procedures were carried out using composite finishing discs and stones (Enhance composite finishing and polish-



**Figure 5** Natural tooth crown pontic (11) in place.



**Figure 6** Natural tooth crown pontic stabilised using fibre-composite resin.

ing system DENTSPLY caulk Dentsply International Inc, Milford, DE). Oral hygiene instructions were given to the patient. First recall appointment was made 1 week later. The patient was highly motivated by the aesthetic result as well as improved ease of biting with no discomfort.

#### **Discussion**

The restoration of a smile is one of the most appreciating and gratifying services a dentist can render. Immediate replacement of lost anterior teeth prevents psychological and social trauma to the patient. Removable appliances or prostheses seem to be one suitable treatment option, but patient compliance is generally a major problem, besides compromised aesthetics because of canine clasps that are commonly used to provide stability and to enhance retention. Moreover, partial removable dentures are frequently subjected to fracture. In this regard, fixed

acid-etch bridging may offer several advantages over removable appliances including enhanced aesthetics, ease of use and avoidance of becoming accustomed to a removable prosthesis (4–6). This approach would also permit utilisation of a patient's natural crown as a pontic (7) for an immediate bridge, with little or no need to perform complicated laboratory procedures. Besides the use of resin composite to splint the pontic to neighbouring sound teeth, the possibility of utilising orthodontic wire or fibre splint has become possible. One major advantage of retaining the patient's natural crown is that, the patient can better tolerate the effect of tooth loss (2). Moreover, it provides the optimal pontic in terms of shape, colour, size and alignment. In this case, shape of natural tooth pontic was given as modified ridge lap pontic with a well-polished and smooth, convex surface that results in pressure-free (8) or mild contact with the alveolar ridge over a very small area for a better preservation of the soft tissue health (9). This particular shape of pontic also helps to give the illusion that the replaced tooth emerges from the gingiva like a natural tooth.

Although the technique is technically demanding, requiring increased chairside time, the key advantages are:

1. excellent aesthetic results;
2. preservation of natural crown structure;
3. extracted tooth can be replaced at the same visit;
4. no laboratory work required;
5. reduces psychological impact on the patient;
6. this technique is reversible and allows other restorative options to be evaluated;
7. can be used as an interim or definitive prosthesis;
8. micro-resiliency of pontic allows stimulation of underlying tissue and avoids excessive post-extraction ridge resorption.

In this case we have used fibre and composite to stabilise natural tooth pontic with abutment teeth, as this technique has been tested by various researchers earlier and shown very satisfying results (2,10–12).

## Conclusion

Management of the consequences of trauma can be as challenging as the treatment of the traumatic injury itself.

Natural tooth crown pontic can be placed as an interim restoration until an extraction site heals which later can be replaced by a conventional bridge or an implant. In this case technique used offers a simple and cost-effective treatment option for the replacement of a fractured tooth, using its own natural coronal portion. It can be considered a hygienic, non-invasive and long-term provisional treatment without bearing any risk of restricting growth, while providing superior aesthetics and function. However, this procedure is highly operator-dependent and demands appropriate case selection and precise technique.

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